Volunteer Lake Assessment Program Individual Lake Reports

LOCKE LAKE, BARNSTEAD, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	2,039	**Max. Depth (m):**	2	**Flushing Rate (yr^{1})**	9.9
Surface Area (Ac.):	149	**Mean Depth (m):**	0.8	**P Retention Coef:**	0.59
Shore Length (m):	8,140	**Volume (m^{3}):**	466,700	**Elevation (ft):**	639

TROPHIC CLASSIFICATION

Year	Trophic class
2010	MESOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

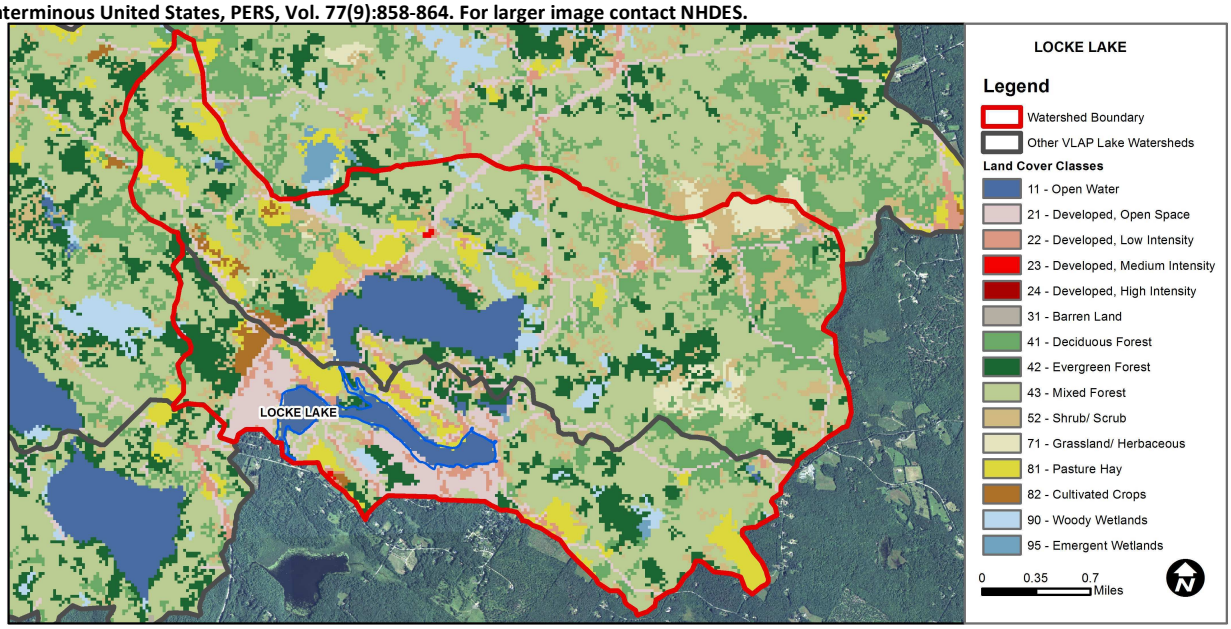
Designated Use	Parameter	Category	Comments
Aquatic Life	pH	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	D.O. (mg/L)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	D.O. (% sat)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	Chlorophyll-a	Cautionary	<5 samples and median is < threshold. More data needed.
Primary Contact Recreation	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Very Good	At least 10 samples with 0 exceedances of criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

LOCKE LAKE - WINCHESTER DRIVE BEACH	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
LOCKE LAKE - VARNEY BEACH	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
LOCKE LAKE - COLONY BEACH	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
LOCKE LAKE - POINT BEACH	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
LOCKE LAKE -N SHORE RD BEACH	E. coli	Encouraging	>2 samples exist that are > 75% of geometric mean criteria, but not enough samples to calculate geomertic mean. No single sample exceedances. More data needed.
LOCKE LAKE - NORTH BARNSTEAD ROAD BEACH	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
LOCKE LAKE - GEORGETOWN BEACH #6	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.

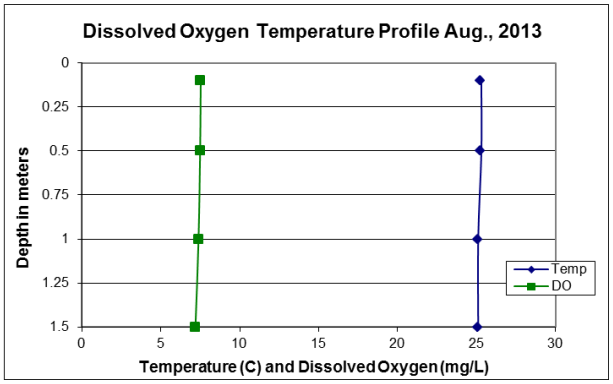


Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	7.34	Barren Land	0.03	Grassland/Herbaceous	2.31
Developed-Open Space	9.43	Deciduous Forest	11.87	Pasture Hay	6.93
Developed-Low Intensity	2.16	Evergreen Forest	11.7	Cultivated Crops	0.96
Developed-Medium Intensity	0.06	Mixed Forest	37.54	Woody Wetlands	1.82
Developed-High Intensity	0	Shrub-Scrub	7.54	Emergent Wetlands	0.3

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
LOCKE LAKE, BARNSTEAD, NH
2013 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **CHLOROPHYLL-A:** Chlorophyll levels decreased from 2012 and were less than the state median.
- **CONDUCTIVITY/CHLORIDE:** Deep spot and tributary conductivity and chloride were slightly elevated above the state medians.
- **TOTAL PHOSPHORUS:** Epilimnetic (deep spot) phosphorus levels decreased from 2012 and were the lowest measured since monitoring began. Tributary phosphorus levels were average for those stations.
- **TRANSPARENCY:** Transparency was good and the Secchi disk was visible on the lake bottom.
- **TURBIDITY:** Deep spot and tributary turbidity levels were low to average.
- **PH:** Deep spot and tributary pH levels were within the desirable range 6.5 – 8.0 units however have historically been less than desirable.
- **DISSOLVED OXYGEN:** Dissolved oxygen levels were high throughout the water column and sufficient to support aquatic life.
- **PHYTOPLANKTON:** A healthy and diverse phytoplankton (algae) population was present.
- **RECOMMENDED ACTIONS:** Increase monitoring frequency to three times per summer, typically June, July and August, to better assess seasonal and historical water quality trends. The increased frequency and intensity of storm events highlights the importance of managing stormwater runoff in the watershed.



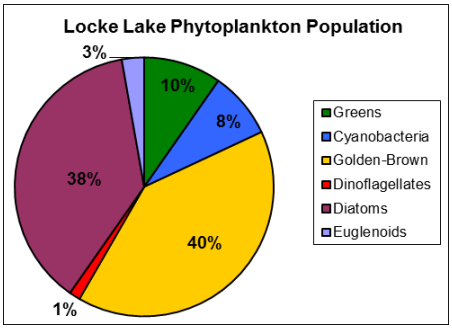


Table 1. 2013 Average Water Quality Data for LOCKE LAKE

Station Name	Alk.	Chlor-a	Chloride	Cond.	Total P	Trans.	Turb.	pH
	mg/l	ug/l	mg/l	uS/cm	ug/l	m	ntu	
						NVS		
Epilimnion	4.80	3.21	15	71.1	14	1.50	0.85	6.67
Inlet			15	70.1	14		0.76	6.77
Munroe Inlet			18	76.1	15		1.11	6.66
North Barnstead Road Beach				76.1	13		0.67	6.70
Outlet				70.9	16		0.83	6.71

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
pH	N/A	Ten consecutive years of data necessary.	Chlorophyll-a	N/A	Ten consecutive years of data necessary.
Conductivity	N/A	Ten consecutive years of data necessary.	Transparency	N/A	Ten consecutive years of data necessary.
			Phosphorus (epilimnion)	N/A	Ten consecutive years of data necessary.